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Acts 4:12

DIVISION OF SDMyers TRANSFORMER CONSULTANTS

26062 Eden Landing Rd., Suite 10
Hayward, California 94545
Phone: (415) 783-7744
Toll Free: (800) 972-5940
Outside Calif. (800) 227-0637

July 23, 1982

Mr. Paul Burton
Lone Star Cement Company
3801 East Marginal Way
Seattle, WA 98134

Re: Dissolved Gas Analysis of Transformer Oil.

S.O. # 82 4 0647

Enclosed please find the results of the dissolved gas analysis of your transformer oils. Each data sheet represents the most current analysis so that you may replace previous reports in your folder.

Immediately after the combustible gas content column you will find a heading entitled, "reference paragraph." These lettered paragraphs are printed on the enclosed "Data Sheet" and give a brief description of the operating condition of the transformer as diagnosed by the Gas Chromatographic test.

Also indicated is the temperature range at the point of any fault so listed.

Our recommendations are given in the last column and reflect our best judgement for your actions.

These recommendations are based on the data, plus other considerations such as size and type of unit, gallons of oil and rate of gas generation.

We trust this information will prove valuable to you and hope to serve you again in the future.

Very truly yours,

John Apilado

John Apilado
Staff Chemist

JA/sb
Enclosures

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REFERENCE PARAGRAPHS

A. The analysis of this sample shows only minor amounts of combustible gas. This is normal and does not warrant concern at this time.

B. The analysis of this sample shows no significant increase in the combustible gas volume. You may assume that this unit is functioning properly at this time.

C. The detection of carbon monoxide indicates overheating of the cellulosic insulation. Probable causes for this condition are: overloading the transformer for an extended period of time, overheated joints, or corona.

D. The detection of methane, ethane, and ethylene indicate overheating of the transformer oil. Probable causes for this condition are: bad leads, or a loose connection either in the tap changer or terminal board areas.

E. The detection of acetylene indicates a high energy discharge (arc). Probable causes for this condition are: worn or pitted tap contacts, deteriorated connections, or a primary or secondary to ground fault.

F. The detection of ethane, methane and ethylene in conjunction with carbon monoxide indicates overheating of the oil impregnated cellulosic insulation. Probable cause for this condition are: a bad lead or a lead connection point in the windings.

G. The detection of ethane, ethylene, and acetylene indicate overheating of the transformer oil coupled with an arc or a spark. A probable cause for this condition is a loose connection either in the tap changer or terminal board areas.

H. The detection of carbon monoxide with acetylene indicates a high energy discharge or arcing involving the cellulosic insulation. Probable causes for this type of condition are: a turn to turn short or a winding to ground short.

I. The detection of all hydrocarbon gases in conjunction with carbon monoxide indicate overheating of the oil impregnated cellulosic insulation coupled with an arc or a spark. Probable causes for this type of condition are: a bad lead or a poor lead connection in the windings or a bad joint.

J. The detection of hydrogen is indicative of a low-energy discharge (corona) or a hydrolysis condition. Probable causes for these conditions are electrical stresses, design errors or moisture contamination.

K. Although the total amount of combustible gas in this unit is minor, the presence of acetylene is some cause for concern. Acetylene is formed from transformer oil only by a high energy discharge (arc).

Y. The ratio of gases produced by this sample is unusual and not covered by our reference paragraphs. See the attached special letter for our analysis and recommendations.

Z. Complete analysis of your transformer and transformer oil requires several different tests. These include a Karl Fischer water content test, liquid power factor, screening tests and PCB tests. Our records do not show a complete series of tests run on this unit. If you have interests or questions on the tests not completed please contact us.

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PHONE: 415-783-7744 - TOLL FREE (800) 972-5940 - OUTSIDE CALIF. (800) 227-0637

TC No. 10

Client Lone Star Cement

Address

City Seattle State WA Zip

AGC2F000015

DISSOLVED GAS ANALYSIS OF TRANSFORMER OILS - GAS CHROMATOGRAPHY (GC)

Location of Equipment Incoming Sub

Type of Equipment XFMR

KVA Rating 1500

Manufacturer Kuhlman Serial No. 2 44583

Gallons Oil 1456

GC Data - Values of Gases are expressed in PPM (Parts Per Million)

Date	Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Ethane	Carbon Dioxide	Ethylene	Acetylene	Total Gas Content	Combustible Gas Content	Reference Paragraph	Fault Temp Range	Recommendation
7/13/82	418	3455	61,801	25	388	17	13,647	trace	*N.D.	79,751	848	C, 1		Retest 6 mo

GC 001 REV A 81 *N.D. NONE DETECTED